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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,145	02/07/2002	Guy E. Averett	ONS00317	1448

7590 02/21/2007

ON Semiconductor
Patent Administration Dept - MD A700
P.O. Box 62890
Phoenix, AZ 85082-2890

EXAMINER	
NADAV, ORI	
ART UNIT	PAPER NUMBER
2811	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/072,145	AVERETT ET AL.	
	Examiner	Art Unit	
	Ori Nadav	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 January 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-10,26,27,29,32 and 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-10,26,27,29,32 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-10 and 26-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claimed limitations of the semiconductor (cap) layer is configured to at least partially convert to an oxide layer that covers the first opening while leaving a void in the second recessed region when the semiconductor substrate is subsequently exposed to an oxidizing environment to form the oxide layer, as recited in claims 1 and 26, respectively, are unclear as to whether the intermediate structure has the semiconductor (cap) layer being at least partially an oxide layer. It is further unclear whether the intermediate structure was exposed or will be exposed to an oxidizing environment. That is, it is unclear whether the intermediate structure comprises a semiconductor layer or an oxide layer.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 6-8, 26, 29 and 32, as best understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Mandelman (6,518,641).

Regarding claims 1 and 26, Mandelman teaches in figure 1G and related text an intermediate semiconductor device, comprising:

a semiconductor substrate 10 having a surface formed with a first recessed region S1;

a first dielectric material 22 formed in the first recessed region;

a second recessed region S2 formed within the first dielectric material, wherein the second recessed region has walls, a lower surface and a first opening in proximity to the surface; and

a semiconductor layer 35 formed overlying the first dielectric material 22 having a second opening at least partially over the first opening, wherein at least a portion of the semiconductor layer is configured to convert to a semiconductor oxide that covers the first opening while leaving a void in the second recessed region when the semiconductor substrate is exposed to an oxidizing environment.

Regarding claims 6-8, 29 and 32, Mandelman teaches in figure 1G and related text, wherein the first dielectric material includes deposited silicon dioxide, and

a layer of material 40 formed overlying the walls of the second recessed region,

wherein the first dielectric material is recessed below a major surface of the

semiconductor substrate;

wherein the first opening S1 is wider than the second opening S2.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 5, 9-10, 27 and 33, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mandelman (6,518,641).

Regarding claims 5, 10, 27 and 33, Mandelman teaches in figure 1G and related text substantially the entire claimed structure, as applied to claims 1 and 26 above, except stating that the semiconductor (cap) layer is configured to convert to a semiconductor oxide comprises polysilicon. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a polysilicon semiconductor (cap) layer to convert to a semiconductor oxide in order to simplify the processing steps of making the device by using a conventional method of forming a semiconductor oxide.

Regarding claim 9, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to recess the first dielectric material below the major

surface a distance of about 0.5 microns in prior art's device in order to adjust the characteristics of the device according to the requirements of the application in hand. Regarding claim 28, the process limitations of "thermally grown silicon dioxide" would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced.

Note that a "product by process" claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

Response to Arguments

Applicant argues that the claimed limitations of the semiconductor layer is configured to at least partially convert to an oxide layer that covers the first opening while leaving a void in the second recessed region when the semiconductor substrate is subsequently exposed to an oxidizing environment to form the oxide layer, as recited in

claims 1 and 26, respectively, are clear because the terms "when" and "subsequently" mean that that the intermediate structure does not include an oxide layer.

Applicant claims a semiconductor layer is configured to at least partially convert to an oxide layer when the semiconductor substrate is subsequently exposed to an oxidizing environment to form the oxide layer. Applicant does not claim a semiconductor layer is configured to at least partially convert to an oxide layer when the semiconductor substrate will subsequently be exposed to an oxidizing environment to form the oxide layer. A recitation in the present term does not necessarily mean future results. Therefore, It is unclear as to whether the intermediate structure has the semiconductor (cap) layer being at least partially an oxide layer. It is further unclear whether the intermediate structure was exposed or will be exposed to an oxidizing environment. That is, it is unclear whether the intermediate structure comprises a semiconductor layer or an oxide layer.

Applicant argues that layer 35 of Mandelman is an oxide layer and not a semiconductor layer, as required in claims 1 and 26.

Claims 1 and 26 recites a semiconductor layer being configured to at least partially convert to an oxide layer when the semiconductor substrate is subsequently exposed to an oxidizing environment to form the oxide layer. Therefore, it is understood that the semiconductor layer is converted to an oxide, and an oxide layer is present in the intermediate structure, and not semiconductor layer.

Applicant argues that Mandelman does not teach a first dielectric material deposited in the first recessed region and formed with a second recessed region having a first opening and walls, because Mandelman's second recessed region is formed in the semiconductor substrate 10.

The claims call for a first dielectric material formed in the first recessed region, a second recessed region formed within the first dielectric material, wherein the second recessed region has walls. Mandelman teaches in figure 1G and related text a first dielectric material 22 formed in the first recessed region, and a second recessed region S2 formed within the first dielectric material (since dielectric material 22 is located on both sides of the second recessed region S2, then the second recessed region S2 formed within the first dielectric material), wherein the second recessed region has walls.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

O.N.
2/15/07

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